Bachelor of Computer Applications

Proposed Scheme of Syllabus

(CHOICE BASED CREDIT SYSTEM)

W.E.F ACADEMIC SESSION 2021-22

BACHELOR OF COMPUTER APPLICATIONS
(BCA) DEGREE

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY
SECTOR-16C, DWARKA, NEW DELHI-110078

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I. BACHELOR OF COMPUTER APPLICATIONS PROGRAMME DETAILS

1. Aim:

The programme covers rudimentary to advance concepts in Computer Science and its applications in various domains. An exceptionally broad range of topics covering current trends and technologies in the field of information technology and computer science are included in the syllabus. The hands on sessions in Computer labs using various Programming languages and tools are also given to have a deep conceptual understanding of the topics to widen the horizon of students' self- experience.

Students, who choose BCA Programme, develop the ability to think critically, logically, analytically and to use and apply current technical concepts and practices in the core development of solutions in the multiple domains.

The knowledge and skills gained with a degree in Computer Application prepare graduates for a wide range of jobs in education, research, government sector, business sector and industry. In broader perspective the mission of teaching BCA is to produce employable IT workforce, that will have sound knowledge of IT and business fundamentals that can be applied to develop and customize solutions for various Enterprises.

2. Programme Objectives:

It is envisioned that the graduates passing out BCA degree, will achieve the following objectives and will be able to

Programme Objectives (POs)	Description
PO1	Understand the fundamental concepts of Computers, Software hardware and peripheral devices and evolution of computer technologies.
PO2	Familiarized with Business environment and Information Technology and its Applications in different domains.
PO3	Gain knowledge to identify, explain and apply functional programming and object-oriented programming techniques and use of databases to develop computer programs.
PO4	Analyze, design, implement and evaluate computerized solutions to real life problems, using appropriate computing methods including web applications.
PO5	Understand the front end and backend of software applications.
PO6	Gain expertise in at least one emerging technology.
PO7	Acquire knowledge about computer architecture and organization, networks, network devices and their configuration, protocols, security concepts at various level etc.

PO8	Apply techniques of software validation and reliability analysis to the development of computer programs.
PO9	Acquire Technical, Communication and management Skills to convey or present information, applications, instructions, policies, procedures, decisions, documentations etc. verbally as well as in writing.
PO10	Recognize the various issues related to society, environment, health and vivid cultures and understand the responsibilities to contribute in providing the solutions.
PO11	Acquire technical skills to lead a productive life in the society as a professional or as an entrepreneur.

3. Programme Learning Outcomes:

The completion of the BCA Programme shall enable a student to:

i) To design, implement, and evaluate computer-based system, process, component, or program to meet desired needs by critical understanding, analysis and synthesis

ii) Identify applications of Computer Science in other fields in the real world to enhance the career prospects

iii) Realize the requirement of lifelong learning through continued education and research.

iv) Use the concepts of best practices and standards to develop user interactive and abstract application

v) Understand the professional, ethical, legal, security, social issues and responsibilities.

The detailed list of programme learning outcomes is as follows:

PLO	Attribute	Description
PLO1	Communication Skills	The student should be able to communicate the technical information both orally and in writing professionally.
PLO2	Use of Software Tools	Create, select, adapt and apply suitable tools and technologies to a wide range of computational activities.
PLO3	Technical Skills	Acquire necessary knowledge of technical, scientific as well as basic managerial and financial procedures to analyze and solve real world problems within their work domain
PLO4	Domain Awareness	Clarity on both conceptual and application oriented skills in commerce, Finance & Accounting and it Applications in Business context.
PLO5	Technical Support	Must be able to provide technical support for various software applications.
PLO6	Analysis and	Ability to analyze research and investigate complex computing

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	investigation of Complex Computing Problems	problems through design of experiments, analysis and interpretation of data and synthesis of the information to arrive at valid conclusions.
PLO7	Design / Development of Solutions	Apply the knowledge gained in core courses to a broad range of advanced topics in computer science, to learn and develop sophisticated technical products independently.
PLO8	Imbibe Cyber Ethics	Awareness on ethics, values, sustainability and creativity aspects of technical solutions.

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II. CHOICE BASED CREDIT SYSTEM (CBCS)

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses.

1. Types of courses in CHOICE BASED CREDIT SYSTEM (CBCS)

1.1 Core Course: A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

1.2 Elective Course: Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

a) **Discipline Specific Elective (DSE) Course:** Elective courses offered by the main discipline/subject of study are referred as Discipline Specific Electives.

b) **Project work/Dissertation** is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A candidate studies such a course on his own with an advisory support by a teacher/faculty member. The work done will have to be submitted in writing as a project report / dissertation.

c) **Generic Elective (GE) Course:** Elective courses that are generic or interdisciplinary by nature chosen from an unrelated discipline/ subject with an intention to seek exposure beyond discipline/s of choice are called Generic Electives. Students will have to choose one elective each in the third and fourth semester from the lists GE1 to GE2 given in this syllabus.

1.3 Ability Enhancement Courses (AEC)

The Ability Enhancement (AE) Courses are the course that lead to Knowledge enhancement. These are of two types.

a) **AE Compulsory Course (AECC):** Environmental Studies, English Communication/MIL Communication.

b) **AE Elective Course (AEEC):** AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc. These courses are to be chosen from a pool of courses designed to provide value-based and/or skill-based instruction.

III PROGRAMME STRUCTURE:

The BCA programme is a three-year course of 160 credits divided into six-semesters. A student is required to complete 150 credits for the completion of course and the award of degree.

	Academic Year	Odd Semester	Credits	Even Semester	Credits
Part – I	First Year	Semester I	26	Semester II	26
Part – II	Second Year	Semester III	27	Semester IV	27
Part – III	Third Year	Semester V	27	Semester VI	27

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Total Credits – 162	80		82

Eligibility Criteria: The detailed eligibility criteria for BCA programme for an academic session will be provided in the admission brochure. However, for quick reference, the eligibility criteria of BCA programme for academic session 2021-22 is as follows:
"Pass in 12th Class of 10+2 of CBSE or equivalent with a minimum of 50% marks in aggregate* with pass in English (core or elective or functional). Mathematics or (Computer Science / Informatics Practice / Computer Applications / Multimedia & Web Technology / Data Management Application / Web Application as compulsory subject of non-vocational stream with 50 theory and 50 practical ratio). OR Three year Diploma in a branch of Engineering from a polytechnic duly approved by All India Council for Technical Education and affiliated to a recognized examining body with a minimum of 50% marks in aggregate."

Admission Criteria: Admission shall be based on the merit of the written test /CET.

IV INSTRUCTION FOR QUESTIONS PAPER SETTER:

a) Question Paper setter for each course must refer the instructions provided with the detailed syllabus of the specific courses.
b) The question paper shall be preferably set from the prescribed text books and reference books, mentioned in the syllabus.

V CREDIT ALLOCATION (BCA PROGRAMME OF STUDY)

Course	**Credits**	
	Theory + Practical	**Theory + Tutorial**
	Core Course (6 credits) (12 papers)	**Core Course (4 credits) (7 papers)**
Core Course Theory 19 Papers	12x4=48	7x3=21
Core Course Practical / Tutorial* 19 Papers	12x2=24	7x1=7
Elective Course (4 Papers of 5 credits each, 5 Papers of 4 credits each and 7 Papers of 2 credits each)		
A.1. Discipline Specific Elective (4 Papers)	4x4 = 16	
A.2. Discipline Specific Elective Practical/Tutorial* (4 Papers)	1×4 = 04	
B.1. Generic Elective/ Interdisciplinary (2 Papers)		2x3 = 06
B.2. Generic Elective Practical/ Tutorial* (2 Papers)		2x1 = 02

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1.Ability Enhancement Compulsory Courses(AECC) (3 Papers of 4 credit each and 1 Paper of 6 Credit including Minor & Major Project)	1x4 + 1x6= 10	2x4=8
2. Ability Enhancement Compulsory Courses(AECC) (2 Papers of 2 credit)		2x2 = 04
Skill Enhancement Courses (SEC) (5 Papers of 2 credit each)	5x2 = 10	
Co-Curricular Activities	2	
Total credit 162	**114**	**48**

*Wherever there is practical, there will be no tutorial and vice-versa

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III. CBCS COURSE STRUCTURE FOR BCA PROGRAMME

1. SEMESTER WISE PLACEMENT OF THE COURSES

Semester	CORE COURSE (18)	Ability Enhancement Compulsory Course (AECC) (3)	Skill Enhancement Course (SEC) (2)	Elective: Discipline Specific (DSE) (5)	Elective: Generic (GE) (2)
I **Total Credits 26**	CC1 (4) Discrete Mathematics	AECC 1 (4) Technical Communication			
	CC2 (4+2) Programming using 'C' Language				
	CC3(4+2) Fundamentals of IT & Computers				
	CC4 (4+2) Web Technologies				
II **Total Credits 26**	CC5 (4) Applied Mathematics	AECC2 (2) Environment Studies	SEC -1 (2)		
	CC6 (4+2) Web Based Programming				
	CC7 (4+2) Data Structure And Algorithm Using 'C'				
	CC8 108 (4+2) Database Management System				
III **Total Credits 27**	CC9 (4) Computer Network	AECC3 (2) Human Values and ethics	SEC -2 (2)	DSE- 1 (4+1)	Any course from the list GE-1(4)
	CC10 (4) Computer Organization and Architecture				
	CC11 (4+2) Object Oriented Programming with C++				
IV **Total Credits 27**	CC12(4+2) Java Programming	AECC4 (4) Introduction to Management & Entrepreneurship Development	SEC-3 (2) Personality Development Skills	DSE -2 (4+1)	Any course from the list GE-2 (4)
	CC13 (4+2) Software Engineering				
V **Total Credits**	CC14 (4+2) Operating System & Linux Programming	AECC 5 Minor Project (4)	SEC-4 (2) Summer Internship	DSE -3 (4+1)	
	CC15(4+2) Computer Graphics				

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27	CC 16 (4) Cloud computing				
VI **Total Credits 29**	CC17 (4) Datawarehousing and Data Mining	AECC 6 Major Project (6)	SEC-5 (2) Seminar/ Conference Presentation	DSE -4 (4+1)	
	CC18 (4) E-Commerce				
	CC19 (4+2) Internet of Things				
	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory (2)			

1.1 Skill Enhancement Course 1(SEC)
SEC 1 (choose one) Skill development course from the following

(i) MOOC course from SWAYAM / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii) Front End Design Tool VB.Net Lab
(iii) Statistical Analysis using Excel
(iv) Designing Lab Photoshop

SEC 2 (choose one)

(i) MOOC course From Swayam / NPTEL of minimum 2 credits. Certificate is Mandatory for the degree
(ii) Designing Lab CorelDraw
(iii) ASP.Net
(iv) AR/VR

1.2 Discipline Specific Electives (DSE) (Choose any One Group of DSE)

DSE-A – Data Science & Analytics

1. Basics of Python Programming
2. Introduction to Data Science
3. Data Visualization & Analytics
4. Machine Learning with Python

DSE-B – Artificial Intelligence & Machine Learning

1. Basics of Python Programming
2. Introduction to Artificial Intelligence
3. Machine Learning with Python
4. Deep Learning with Python

DSE-C– Cyber Security

1. Cyber Security
2. Network Security
3. Web Security
4. IT Acts and Cyber Laws

DSE-D – Software Development

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1. Basics of Python Programming
2. Web Development with Python
3. Web Development with Java & JSP
4. Mobile Application Development

1.3Generic Elective (GE) for BCA Students

GE 1 (choose any One)

(i) Principles of Management & Organizational Behaviour
(ii) Any One Paper Offered as open elective by other School /Department / Programme

GE 2 (choose any One)

(i) Digital Marketing
(ii) Principles of Accounting
(iii) Any One Paper Offered as open elective by other School / Department / Programme

1.4Generic (Open) Electives for other undergraduate programmes

The following Core courses of BCA programme may be offered as Generic Elective for other undergraduate programmes. Maximum number of students from other School / Department / Programme should not exceed 20% of total intake for the programme.

S.No.	Semester	Subject Code	Subject Name
1	I	BCA 105 BCA 173	Fundamentals of Computers & IT Practical – II IT Lab
2	I	BCA 107 BCA 175	Web Technologies Practical-III Web Tech Lab
3	II	BCA 108 BCA 176	Database Management System Practical – VI DBMS Lab
4	III	BCA 205 BCA 271	Object Oriented Programming using C++ Practical – VI C++ Lab
5	III	BCA 211	Basics of Python Programming
6	VI	BCA 304	E-Commerce

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SEMESTER WISE EVALUATION SCHEME

Based on the above-mentioned course categories the semester wise Evaluation scheme of BCA Programme will be as follows:

FIRST SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 101	Discrete Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 103	Programming Using 'C' Language	Core Course Theory	3	1	4	25	75	100
BCA 105#	Fundamentals of Computers & IT	Core Course Theory	3	1	4	25	75	100
BCA 107#	Web Technologies	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 109	Technical Communication	AECC	3	1	4	25	75	100
Core Course Practicals								
BCA 171	Practical – I 'C' Prog. Lab	Core Course Practical	0	4	2	40	60	100
BCA 173#	Practical – II IT Lab	Core Course Practical	0	4	2	40	60	100
BCA 175#	Practical-III Web Tech Lab	Core Course Practical	0	4	2	40	60	100
Bridge Course (Mandatory for Students from Non Mathematics background)								
BCA 181^{+}	Bridge Course in Mathematics	Mandatory for Students from Non Mathematics background	2	0	0	Pass Grade	------	------
	Total Credits				**26**			**800**

$^{+}$ Non Credit subject mandatory for the students who do not have mathematics in 12th std. The student has to obtain at least pass marks (40). The examination of this paper shall be conducted by the concerned teacher teaching the course / paper as Teacher's Continuous Evaluation for total 100 marks. Only the Pass / Fail status is to be specified on the marksheet of the examination and the result of the student. Passing is mandatory for student not having mathematics in 12th std.

 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

SECOND SEMESTER EXAMINATION

Code No.	Paper	Course Category	L	T/P	Credits	Marks Internal	Marks External	Max Marks
Core Course Theory								
BCA 102	Applied Mathematics	Core Course Theory	3	1	4	25	75	100
BCA 104	Web based Programming	Core Course Theory	3	1	4	25	75	100
BCA 106	Data Structure And Algorithm Using 'C'	Core Course Theory	3	1	4	25	75	100
BCA 108#	Database Management System	Core Course Theory	3	1	4	25	75	100
Ability Enhancement Compulsory Course (AECC)								
BCA 110	Environment Studies	AECC	2	0	2	25	75	100
***Skill Enhancement Course (AEEC) (Choose any One)**								
BCA 132	**MOOC course from SWAYAM / NPTEL	SEC-1	0	0	2	100	0	100
BCA 134	Front End Design Tool VB.Net Lab	SEC-1	0	4	2	100	0	100
BCA 136	Statistical Analysis using Excel	SEC-1	0	4	2	100	0	100
BCA 138	Designing Lab Photoshop	SEC-1	0	4	2	100	0	100
Core Course Practical								
BCA 172	Practical-IV WBP Lab	Core Course Practical	0	4	2	40	60	100
BCA 174	Practical – V DS Lab	Core Course Practical	0	4	2	40	60	100
BCA 176#	Practical – VI DBMS Lab	Core Course Practical	0	4	2	40	60	100
	Total				**26**			**900**

***NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute)**

 # Generic Elective (GE) for other undergraduate programmes

TOTAL MARKS: 900

**Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.

3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.

4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

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SEMESTER WISE EVALUATION SCHEME

THIRD SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 201	Computer Network	Core Course Theory	3	1	4	25	75	0	100
BCA 203	Computer Organization and Architecture	Core Course Theory	3	1	4	25	75	0	100
BCA 205#	Object Oriented Programming with C++	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 207	Human Values and Ethics	AECC	2	0	2	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 211#	Basics of Python Programming	DSE-1	4	1	5	25	50	25	100
BCA 213	Cyber Security	DSE-1	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 221	Principles of Management & Organizational Behaviour	GE-1	3	1	4	25	75	0	100
BCA 223	Open Elective offered by other Department/School /programme	GE-1	3	1	4	25	75	0	100
*****Skill Enhancement Course (AEEC) (Choose any One)**									
BCA 231	****MOOC course from SWAYAM / NPTEL	SEC-2	0	0	2	100	0	0	100
BCA 233	Designing Lab CorelDraw	SEC-2	0	4	2	100	0	0	100
BCA 235	ASP.Net	SEC-2	0	4	2	100	0	0	100
BCA 237	AR/VR	SEC-2	0	4	2	100	0	0	100
BCA	Cyber Ethics	SEC-2	2	0	2	100	0	0	100

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239									
Core Course Practical									
BCA 271#	Practical – VII C++ Lab #	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

 # Generic Elective (GE) for other undergraduate programmes
*** First Subject from Discipline specific chosen group**
**** Choose one subject from list of GE-1**
***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

****Instructions for MOOC course

1. MOOC Course should be done from SWAYAM/NPTEL as per the guidelines of UGC.
2. For securing the credits, the student is required to complete the assessment of the course and to provide the certificate of the course done from SWAYAM/NPTEL.
3. The fees (if any) for the registration and/or assessment of the MOOC course must be borne by the student only.
4. If the student secures more than 2 credits for the MOOC Course even then 2 credits shall be considered for this subject and the grade/marks provided by assessing authority shall be transferred to the university by the institution where the student is studying. The University's Examination Division shall take the result of the MOOC course on record and a result declared for these papers. The student must submit the result of such papers to their respective institution. All the results for the MOOC courses may be submitted before the completion of other requirements including credits requirement.

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

FOURTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 202	Java Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 204	Software Engineering	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 206	Introduction to Management & Entrepreneurship Development	AECC	3	1	4	25	75	0	100
***Discipline Specific Elective (Choose any One)**									
BCA 212	Introduction to Data Science	DSE-2	4	1	5	25	50	25	100
BCA 214	Introduction to Artificial Intelligence	DSE-2	4	1	5	25	50	25	100
BCA 216	Network Security	DSE-2	4	1	5	25	50	25	100
BCA 218	Web Development Using Python and Django	DSE-2	4	1	5	25	50	25	100
****Generic Elective (Choose any One)**									
BCA 222	Digital Marketing	GE-2	3	1	4	25	75	0	100
BCA 224	Principles of Accounting	GE-2	3	1	4	25	75	0	100
BCA 226	Open Elective offered by other Department/ School /programme	GE-2	3	1	4	25	75	0	100
***Skill Enhancement Course (AEEC)**									
BCA 232	Personality Development Skills	SEC-3	2	0	2	100	0	0	100
Core Course Practical									
BCA 272	Practical –VIII Java Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 274	Practical – IX SE Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

* **Second Subject from Discipline specific chosen group**

** **Choose one subject from list of GE-2**

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***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment**

Summer Training will be held for 4 weeks after the end of fourth semester. Viva-Voce will be conducted in fifth semester.

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

FIFTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 301	Operating System & Linux Programming	Core Course Theory	3	1	4	25	75	0	100
BCA 303	Computer Graphics	Core Course Theory	3	1	4	25	75	0	100
BCA 305	Cloud Computing	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 307	Minor Project	AECC	0	8	4	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 311	Data Visualization & Analytics	DSE-3	4	1	5	25	50	25	100
BCA 313	Machine Learning with Python	DSE-3	4	1	5	25	50	25	100
BCA 315	Web Security	DSE-3	4	1	5	25	50	25	100
BCA 317	Web Development with Java & JSP	DSE-3	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 331	Summer Training Project	SEC-4	0	0	2	100	0	0	100
Core Course Practical									
BCA 371	Practical – X Linux - OS Lab	Core Course Practical	0	4	2	40	0	60	100
BCA 373	Practical – XI CG Lab	Core Course Practical	0	4	2	40	0	60	100
	Total				**27**				**800**

*** Third Subject from Discipline specific chosen group**

*****NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute) i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment. Evaluation will be based on Summer Training held after fourth semester.**

TOTAL MARKS: 800

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SEMESTER WISE EVALUATION SCHEME

SIXTH SEMESTER EXAMINATION

Code No.	Paper	Course Type	L	T/P	Credits	Marks Internal	Marks External		Max Marks
							Th	Pr	
Core Course Theory									
BCA 302	Data Ware Housing & Data Mining	Core Course Theory	3	1	4	25	75	0	100
BCA 304#	E- Commerce	Core Course Theory	3	1	4	25	75	0	100
BCA 306	Internet of Things	Core Course Theory	3	1	4	25	75	0	100
Ability Enhancement Compulsory Course (AECC)									
BCA 308	**Major Project	AECC	----	12	6	40	0	60	100
***Discipline Specific Elective (Choose any One)**									
BCA 312	Machine Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 314	Deep Learning with Python	DSE-4	4	1	5	25	50	25	100
BCA 316	IT Act and Cyber Laws	DSE-4	4	1	5	25	75		100
BCA 318	Mobile Application Development	DSE-4	4	1	5	25	50	25	100
***Skill Enhancement Course (AEEC)**									
BCA 332	Seminar/ Conference Presentation	SEC – 5	0	0	2	100	0	0	100
Core Course Practical									
BCA 372	Practical – XII IOT Lab	Core Course Practical	0	4	2	40	0	60	100
$ BCA 374	NSS / NCC / Cultural Clubs / Technical Society / Technical Clubs	Mandatory	0	0	2	100	0	0	100
	Total				**29**				**800**

***Fourth Subject from Discipline specific chosen group.**

****The student shall do the Major project in the Discipline Specific Area/Curriculum based subject /any emerging technology.**

***** NUES (Non – University Examination Subject) – Only Internal Assessment by the Institute i.e. the assessment shall be conducted by the institution for all 100 marks as Teacher's Continuous Assessment .Evaluation will be based on the presentation on any latest**

technology/research article in in-house/external seminar/conference and will be conducted by the college committee only.

 # Generic Elective (GE) for other undergraduate programmes

$ NUES (Non – University Examination Subject) Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs out of 100 marks as per evaluation schemes worked out by these societies / organizations at the institution / University level. The coordinators shall be responsible for the evaluation of the same. These activities shall start from the 1st semester and evaluation shall be conducted at the end of 6th semester for the students admitted in the first semester.

Note: Any Elective Subject will be offered if minimum 1/3 rd of the total strength of students in the class will opt for it.

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Course Code: BCA 202 **L T C**
Course Name: Java Programming **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Learn how to implement Object Oriented concepts through Java.
2. Identify and apply the Java thread model to program Java applications.
3. Develop GUI applications using Java swings

PRE-REQUISITES:

1. Programming fundamental
2. Object-Oriented concepts

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Illustrate the Object-Oriented paradigm and Java language constructs	BT2	PO3
CO2	To inculcate concepts of inheritance to create new classes from existing ones and design the Classes needed given a problem specification.	BT3	PO3
CO3	To familiarize the concepts of packages and interfaces.	BT3	PO4
CO4	To facilitate students in handling exceptions and defining their own exceptions.	BT4	PO4
CO5	To manage input output using console and files	BT4	PO4
CO6	To apply the Java Thread model to develop multithreading applications.	BT5	PO4
CO7	To understand and apply the concepts of GUI programming using swings.	BT6	PO5, PO6

UNIT–I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 1, 2, 3, 5, 6], TB2[Chapters - 2, 3, 4, 5, 6, 7, 8]

Bachelor of Computer Applications

Java Basics: Java as Object-oriented Programming Language History of Java, Features of Java, Difference between Java and C++, Java Architecture (JDK, JVM, JRE), Java Tokens: Data types, Literals, Variables, Scope and lifetime of variables, Operators. Control Structures, Arrays.
Introducing Classes: Creating a Class: properties, methods and constructors. Object Access modifiers, Method Overloading, Garbage collection, this keyword, Static (variable, method, block), final keyword, Wrapper Classes, String class and methods.

UNIT – II

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters – 7, 8, 9], TB2[Chapters - 9, 10, 11]

Inheritance: Types, Super keyword, method overriding, covariant return type, abstract class.
Interfaces and Packages: Creation and implementing an interface, difference between abstract class and interface, Packages, and importing a package.
Exception Handling: Exception Class, built-in checked and unchecked exceptions, user-defined exceptions, use of try, catch, throw, throws, finally

UNIT – III

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 11, 12], TB2[Chapters - 13]

Using I/O: Elementary concepts of Input/Output, using the byte streams, reading and writing using byte streams, automatically closing a file, using the character-based streams, File I/O using character streams (using a File Writer and using a File Reader)
Multi-threaded programming: Multithreading fundamentals, Thread class, and Runnable interface, the life cycle of thread, creation of single and multiple threads, implementation of Thread methods, Synchronization (using Synchronized methods, synchronized statement).

UNIT – IV

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters – 17, 18]

Swings Fundamentals: Components (JLabel and ImageIcon, using swing Buttons (JButton, JToggleButton, JCheckBox, JRadioButton), JTextField, JScrollPane, JList, JComboBox) and Containers, Layout managers, event delegation Model, event handling (event sources, event listeners, event classes and interfaces, adapter classes).
JDBC: JDBC Architecture, JDBC Drivers, Connection, Statement, Prepared Statement, Result set, Connecting to the Database using JDBC.

TEXT BOOKS:

TB1. Herbert Schildt, "Java 2 -The Complete Reference" – Tata McGraw Hill Education Private Limited, 2010
TB2. Trilochan Tarai, "Java Core Concepts and Applications", I.K. International Publishing house pvt. Ltd., 2015

REFERENCEBOOKS:

RB1. E.Balaguruswamy,"Programming with Java A Primer", McGraw Hill Education Private Limited, 5th Edition,2015.
RB2. Herbert Schildt, Dale Skrien, "Java Fundamentals A Comprehensive Introduction" – Tata McGraw Hill Education Private Limited, 2013
RB3. Cay S. Horstmann, "Core Java Volume 1 – Fundamentals", 10th edition, Pearson, 2017
RB4. Ken Arnold, Davis Holmes, James Gosling, Prakash Goteti, "The Java Programming Language", 3rd edition, Pearson, 2008.

Bachelor of Computer Applications

Course Code: BCA 204 **L T C**
Course Name: Software Engineering **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

The paper aims to understand the importance, limitations and challenges of processes involved in software development. In this course, the learners will be able to develop expertise related to the following:

1. To gain knowledge of various software models.
2. To gain knowledge of various software design activities.
3. To learn cost estimation, software testing, Maintenance and debugging.

PRE-REQUISITES:

NONE

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	To evaluate languages to code front end and back end of a software	BTL2	PO5
CO2	Instantiating into the process of designing, coding and testing a software module.	BTL2	PO4
CO3	Organizing a software product along with its complete documentation.	BTL6	PO1
CO4	Implementing Software Development Cycle to develop a software module.	BTL5	PO4
CO5	To analyze the use of techniques, skills and modern engineering tools necessary for software development.	BTL2	PO6
CO6	Organizing a complete software module	BTL3	PO8

UNIT – I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters - 1, 3], TB2 [Chapters - 3, 5]

Introduction of software engineering: Software Crisis, Software life cycle models, Waterfall, Prototype, Spiral Models, Agile model.

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD, Requirement analysis using (DFD use-case, sequence and

class diagram (with case studies), ER Diagrams, Requirements documentation: SRS, Characteristics & organization of SRS

UNIT – II

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter - 1, 4]

Software Project Planning: Software Metrics-Definition and Need, Types of Metrics-Product, Process and Project Metrics, Size Estimation like lines of Code & Function Count, Halstead Software Science measure, Cost Estimation: Need, Models COCOMO: Basic model, Intermediate model

Risk Management: Software Risks, Types of risk, risk management activities: risk assessment, risk control.

UNIT – III

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter - 5, 6], TB2 [Chapter - 24]

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling,

Quality management: Quality concept, software quality assurance, Total Quality Management (TQM), software review, software inspection

Software Implementation: Structured coding techniques, coding style, Standards and guidelines, documentation guidelines. Reverse Engineering, Software Re-engineering, Configuration Management.

UNIT – IV

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapter 8, 9], TB2 [Chapter 8]

Software Testing: Testing Process, Levels of Testing: Unit testing, Integration testing and system testing. Types of Testing: Manual testing, Automation Testing. Methods of Testing- , Black box, White box and Grey Box Testing. Validation, Verification, Alpha-Beta testing, Acceptance testing, Functional Testing and its types, Structural Testing Difference between: Testing and Debugging

Software Maintenance: Management of Maintenance, The Maintenance Process and Types of maintenance: Preventive, Perceptive, Adaptive and Corrective Maintenance.Maintenance tools and techniques.

TEXT BOOKS:

TB1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.

TB2. I. Sommerville, "Software Engineering", 9th Edition, Pearson Edu.

REFERENCE BOOKS:

RB1. Jibitesh Mishra and Ashok Mohanty, "Software Engineering", Pearson

RB2. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.

RB3. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons.

Bachelor of Computer Applications

Course Code: BCA 206 **L T C**
Course Name: Introduction to Management and Entrepreneurship Development **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Development of critical thinking and to inspire students to developed an entrepreneurial mind-set.
2. Acquisition of values and attitudes towards understanding complex business problems
3. Promoting active participation in solving current business problems and preventing the future ones.
4. Encouraging students to understand the fundamentals of management

PRE-REQUISITES:

Basic awareness about the Entrepreneurship Development

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Gain in-depth knowledge on Entrepreneurial development in today's global scenario	BTL2	PO2, PO10, PO11
CO2	Understand the concept of entrepreneurs and to help the students to develop an entrepreneurial mind-set	BTL3	PO9, PO10, PO11
CO3	Develop critical thinking for shaping strategies and help them to become an successful entrepreneur	BTL3	PO3, PO5, PO11
CO4	Acquire values and attitudes towards understanding complex business problems, and active participation in solving current business problems.	BTL4	PO3, PO10, PO11

CO5	Understand the concept of the fundamentals of management	BTL5	PO2, PO5, PO10, PO11

UNIT–I

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters - 1, 2], TB2 [Chapters - 1, 2, 3], TB3 [Chapter - 1]

Introduction to Entrepreneurship: Meaning and concept of entrepreneurship, the history of entrepreneurship development, Role of entrepreneurship in economic development, General characteristics and personality traits of entrepreneurs. Factors affecting entrepreneurship, Agencies in entrepreneurship development in India.

UNIT–II

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter - 11], TB2 [Chapters - 6, 7], TB3 [Chapter - 4]

Creativity: Necessity of Creativity in the development of entrepreneur, Steps in Creativity, Defining Innovation, importance of innovation. Identification of opportunities for problem solving with innovation. Decision making and Problem Solving (steps indecision making). Example from industry, day to day operations

UNIT–III

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter - 7], TB2 [Chapters - 10, 2, 1]

Role of an Entrepreneur: The Entrepreneur's role in the context of contribution to society; Examples from industry; the role of changing the mindset and the development of out of box thinking. Introduction to Design Thinking. Entrepreneurs as role models, mentors and influencers. Entrepreneurial success stories.
Historical Perspective, Global Indian Entrepreneurs, Institutions, Modern Entrepreneurs

UNIT–IV

No. of Hours: 10 Chapter/Book Reference: TB3 [Chapters - 21, 22]

Fundamentals of Management: Meaning of Business and its management the role and importance of leadership in entrepreneurship. Difference between Management and Leadership. The importance of planning in entrepreneurship venture. The role and importance of business plan in entrepreneurship venture

TEXT BOOKS:

TB1. S.S Khanka, Entrepreneurship Development, S.Chand
TB2. Sangram Keshari Mohanty, Fundamentals of Entrepreneurship, PHI Learning Private Limited 2018
TB3. Abha Mathur; Entrepreneurship Development, Taxman, Fifth Edition

REFERENCE BOOKS

RB1. Srivastava S. B: A Practical Guide to Industrial Entrepreneurs; Sultan Chand and Sons, New Delhi.
RB2. Prasanna Chandra: Protect Preparation, Appraisal, Implementation; Tata McGraw Hill. New Delhi.
RB3. Chabbra, T.N, Entrepreneurship Development, Sun India

Bachelor of Computer Applications

Course Code: BCA 212 **L T C**
Course Name: Introduction to Data Science **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. Apply mathematical principles to the analysis of data.
2. Analyze data sets in the context of real world problems.
3. Develop and implement data analysis strategies base on theoretical principles, ethical considerations, and knowledge of the underlying data

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Basics of Data Science and Data Collection strategies	BTL2	PO1, PO2, PO3,PO7
CO2	Illustrating statistical analysis of data.	BTL3	PO1, PO2, PO3, PO7.
CO3	Working with the data structures of python like series and Data Frames	BTL3	PO1, PO2, PO3,PO4
CO4	Statistical analysis of data with the help of python	BTL3	PO1, PO2, PO3

UNIT–I

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters - 1, 2]

Introduction to data Science, Evolution of Data Science, Data Science Roles, Stages in a Data science Project, Applications of Data Science In various fields, Data security Issues.
Data Collection Strategies, Data Pre-processing overview- Data Cleaning- Data Integration and transformation- Data Reduction- Data Discretization.

UNIT–II

No. of Hours: 11 Chapter/Book Reference: TB2 [Chapters - 4, 6, 7, 14]

Statistics for Data Science: Describing a Single Set of Data, Central Tendencies and Dispersion. Descriptive Statistics- Mean, standard Deviation, Skewness and Kurtosis, Box plots, Pivot Table, Linear Regression.

UNIT–III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 5, 6, 7]

Why Python? - Essential Python libraries

Introduction to NumPy: NumPy Basics: Arrays and Vectorized Computation- The NumPyndarray- Creating ndarrays- Data Types for ndarrays- Arithmetic with NumPy Arrays- Basic Indexing and Slicing

Data handling using Pandas in python: Series (creation from ndarray, dictionary; mathematical operations; Head and Tail functions), DataFrames (creation from dictionary of series, operations on rows and columns).

Statistical functions using pandas like min, max, count, sum, quartile, standard deviation, variance & DataFrame operations like aggregation, group by, Sorting, Deleting, Renaming Index, Pivoting.

UNIT–IV

No. of Hours: 11 Chapter/Book Reference: TB2 [Chapters - 15, 20, 23]

Case Studies: Checking different patterns in data, Forecasting demand, investigating clinical data

TEXT BOOKS:

TB1. McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly, 2nd Edition,2018

TB2. Agile tools for real world data : Python for Data Analysis by Wes McKinney, O'Reilly

TB1. Applying Data Science Business Case Studies Using SAS By Gerhard Svolba · 2017

REFERENCE BOOKS:

RB1. Python: The Complete Reference by Martin Brown

RB2. Programming Python, 4th Edition by Mark Lutz Released December 2010 Publisher(s): O'Reilly Media, Inc.

List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO #**
1.	Create a pandas series from a dictionary of values and an ndarray.	CO1, CO3
2.	Create a Series and print all the elements that are above 75^{th} percentile.	CO2, CO3
3.	Perform sorting on Series data and DataFrames	CO2, CO3
4.	Write a program to implement pivot() and pivot-table() on a DataFrame.	CO2, CO3, CO4
5.	Write a program to find mean absolute deviation on a DataFrame.	CO2, CO3, CO4
6.	Two Series object, Population stores the details of four metro cities of India and another object AvgIncome stores the total average income reported in four years in these cities. Calculate income per capita for each of these metro cities.	CO2, CO3, CO4
7.	Create a DataFrame based on E-Commerce data and generate mean, mode, median.	CO2, CO3, CO4

8.	Create a DataFrame based on employee data and generate quartile and variance.	CO2, CO3, CO4
9.	Program to implement Skewness on Random data.	CO2, CO3, CO4
10.	Create a DateFrame on any Data and compute statistical function of Kurtosis.	CO2, CO3, CO4
11.	Series objects Temp1, temp2, temp3, temp 4 stores the temperature of days of week 1, week 2, week 3, week 4. Write a script to:- a. Print average temperature per week b. Print average temperature of entire month	CO2, CO3, CO4
12.	Write a Program to read a CSV file and create its DataFrame.	CO2, CO3, CO4
13.	Consider the DataFrame QtrSales where each row contains the item category, item name and expenditure and group the rows by category, and print the average expenditure per category.	CO2, CO3, CO4
14.	Create a DataFrame having age, name, weight of five students. Write a program to display only the weight of first and fourth rows.	CO2, CO3, CO4
15.	Write a program to create a DataFrame to store weight, age and name of three people. Print the DataFrame and its transpose.	CO2, CO3, CO4

Note:
1. In total 10 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 214 **L T C**
Course Name: Introduction to Artificial Intelligence **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To learn the basics of designing intelligent agents that can solve general purpose problems.
2. To represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

PRE-REQUISITES:

Basic Programming Skills

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	To understand elements constituting problems and learn to solve it by various uninformed and informed (heuristics based)	BTL1,BTL2, BTL3,	PO1, PO2,PO4
CO2	To understand formal methods for representing the knowledge and the process of inference to derive new representations of the knowledge.	BTL2, BTL3	PO1, PO2, PO4,
CO3	Analyze and apply the notion of uncertainty and some of probabilistic reasoning methods to deduce inferences under uncertainty	BTL3, BTL4	PO1, PO2, PO4,
CO4	Apply some mechanisms to create and improve AI system.	BTL3, BTL5	PO4, PO6, PO8

UNIT–I

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters - 1, 2, 3]; TB2 [Chapters- 1, 3, 4]

Overview of AI: Introduction to AI, Importance of AI, AI and its related field, AI techniques, Criteria for success.

Problems, problem space and search: Defining the problem as a state space search, Production Systems and its characteristics, Issues in the design of the search programs.

Heuristic search techniques: Generate and test, hill climbing, best first search technique, problem reduction, constraint satisfaction.

UNIT–II

No. of Hours: 12 Chapter/Book Reference: TB1 [Chapters - 5, 6]; TB2 [Chapters - 7, 8, 9, 10] RB1 [Chapters - 5, 6, 7]

Knowledge Representation: Definition and importance of knowledge, Knowledge representation, various approaches used in knowledge representation, Issues in knowledge representation.
Logical Reasoning: Logical agents, propositional logic, inferences, Syntax and semantics of First Order Logic, Inference in First Order Logic Knowledge Base, forward chaining, backward chaining, unification, resolution, Expert system : Case study of Expert system in PROLOG

UNIT–III

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapters - 7, 8, 15]; TB2 [Chapters - 13, 14]

Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, Bayes 'Theorem, Certainty factors and Rule-based Systems, Bayesian Networks, Dempster-Shafer Theory, Introduction to Fuzzy logic. Fuzzy set definition & types. Membership functions. Designing a fuzzy set for a given application
Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing, Pragmatic Processing**.**

UNIT–IV

No. of Hours: 10 Chapter/Book Reference: TB1 [Chapter 17]; TB2 [Chapters - 18, 19]

Learning: Introduction to Learning, Rote Learning, learning by taking advice, learning in problem solving, learning from examples: Induction, Explanation-based Learning, Discovery, Analogy, Neural Networks, and Genetic Learning.

TEXT BOOKS:

TB1. Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992.
TB2. Stuart Russell and Peter Norvig, "Artificial Intelligence: A Modern Approach", Prentice Hall, Second Edition (Indian Reprint: Pearson Education)

REFERENCE BOOKS:

RB1. Ivan brakto :"Prolog Programming for AI ", Addison Wesley
RB2. George F.Luger Artificial Intelligence Pearson Education
RB3. Ben Coppin Artificial Intelligence Illuminated Jones and Bartlett Publisher

List of Practicals

S. No.	Detailed Statement	Mapping to CO #
1.	Write a program to implement Breadth First and Depth First Search	CO1
2.	Write a Program for the Best First Search and A* search algorithm	CO1
3.	Write a program to implement Water Jug Problem	CO1
4.	Write a program to implement 4-Queen Problem	CO1
5.	Write a program to implement AO* algorithm	CO1

6.	Write a program to implement hill climbing & steepest ascent hill climbing algorithm	CO1
7.	Write a program to implement Travelling Salesman Problem	CO1
8.	(a) Write a program to implement List operations (Nested List, Length, Concatenation, Membership, Iteration, Indexing and Slicing)? (b) Write a program to implement List methods (Add, Append, and Extend & Delete).	CO2
9.	Write a program to implement First Order Predicate using: a. Backward Chaining b. Forward Chaining	CO2
10.	(a) Write a program to remove stop words for a given passage from a text file using Natural Language Toolkit (NLTK)? (b) Write a program to implement stemming for a given sentence using NLTK? (c) Write a program to POS (Parts of Speech) tagging for the given sentence using NLTK? (d) Write a program to implement Lemmatization using NLTK?	CO3
11.	(b) Write a program for Text Classification for the given sentence using NLTK?	CO3
12.	Write a program to implement Artificial Neural Network (ANN) for Classification using a dataset	CO4
13.	Write a program to implement Genetic Algorithm for different types of gene representation	CO4
14.	Write a program to implement ANN for Bayesian networks	CO4
15.	Write a program to implement back propagation algorithm using ANN	CO4

Note:
1. In total 10 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 216 **L T C**
Course Name: Network Security **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its sub parts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Students will be able to learn about basic security issues and concepts of Network Security.
2. Students will be able to understand the Describe briefly the use of Cryptography and Steganography.
3. To develop graduates that can identify, analyze, and remediate network security breaches.
4. To learn about Firewall and his principles.
5. Students will be able to understand the concept of Kerberos and use of this.
6. To Design and Implement different network security algorithm by using Program.
7. Students will be able to understand the computer network and secure network communication issues along with their remedies.
8. Students will be able to learn and evaluate the different algorithm by using Program.

PRE-REQUISITES:

1. Computer Network
2. C, C++ (Programming Knowledge of C/C++)

COURSE OUTCOMES(COs):

After completion of this course, the learners will be able to: -

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Define and explain the issues and basic concepts of Network Security. To understand how to draw a network model.	BTL1, BTL2, BTL4	PO7
CO2	To Explain, understand and summarize the concepts, types and features of Firewall.	BTL2	PO1, PO7
CO3	Explain and implement working of authentication, authorization, Packet security, IP Security, Firewall by using some suitable examples.	BTL3, BTL2	PO3, PO4, PO7
CO4	Classify and organize the architecture of network security management.	BTL2, BTL4	PO7

CO5	Evaluate different Network Security algorithms with the help of program.	BTL5	PO3, PO4, PO7
CO6	Design and create a network security architecture for an organization.	BTL6	PO4, PO7, PO8

UNIT–I

No. of Hours: 12 Chapter/Book Reference: TB2 [Chapters - 1, 2]

Introduction to Network Security and related issues- authentication, confidentiality, integrity, anonymity, etc. Network Security Models, Network Security Threats, Secure socket layer (SSL)/ Transport layer security (TLS), Public Key Infrastructure, Digital Signature Schemes.

UNIT–II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 5]

Firewalls: Overview, Types, Features, User Management, Intrusion Detection and Prevention Systems, Intruders, Viruses and Related Threats, Firewall Design Principles, Packet filtering firewall, VPN.

UNIT–III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters - 3, 4]

Authentication applications - Kerberos, X.509, E-Mail security, pretty good privacy (PGP), Secure Multipurpose Internet Mail Extensions (S/MIME), IP security overview, IP security policy, Encapsulating security payload (ESP).
Network Management Security: Overview of SNMP Architecture. Available software platforms/case tools, Configuration Management.

UNIT–IV

No. of Hours: 10 Chapter/Book Reference: TB2 [Chapter - 8]

Intrusion Detection: Intruders, Intrusion Detection, Host-Based Intrusion Detection, Distributed Host-Based Intrusion Detection, Network-Based Intrusion Detection, Distributed Adaptive Intrusion Detection, Intrusion Detection Exchange Format, Honeypots, Virtual Private Network

TEXT BOOKS:

TB1. Kaufman et al., Network Security, Second Edition, Publisher: Prentice Hall, 2002.
TB2. Stallings and Brown, Computer Security: Principles and Practice, Fourth Edition, Publisher: Pearson, 2018.

REFERENCE BOOKS:

RB1. Trappe and Washington, Introduction to Cryptography with Coding Theory, Third Edition, Publisher: Pearson, 2020.
RB2. Principles of Information Security: Michael E. Whitman, Herbert J. Mattord, CENGAGE Learning, 4th Edition.
RB3. Kaufman et al., Network Security, Second Edition, Publisher: Prentice Hall, 2002.
RB4. W. Mao, "Modern Cryptography – Theory and Practice", Pearson Education.

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List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO#**
1.	Implement Security Monitoring Tools	CO1, CO3
2.	To study and implement Public Key cryptographic systems	CO1, CO3
3.	Implement Digital Signatures.	CO1, CO3
4.	Demonstrate any one honeypot tools for preventing intrusion detection.	CO1, CO5, CO6
5.	Study and implement how you create an email policy for your organization.	CO1, CO3
6.	Create and Implement Configure IP Address in a system in LAN	CO1, CO3
7.	Implement S/MIME Policy.	CO1, CO3
8.	Configure Mail server	CO1, CO3
9.	Configuring Windows Firewall and implement user management	CO1, CO2
10.	Implement network firewall security	CO1, CO2

Note:
1. In total 10 practicals to be implemented. 2 additional practical may be given by the course instructor.
2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 218 **L P C**
Course Name: Web Development with Python and Django **4 1 5**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

The students will be able to develop expertise related to the following:

1. Understand the model view controller (MVC) and Model View template (MVT) pattern and how it is implemented in Django
2. Create Django templates for easy-to-modify views
3. Map views to URLs
4. Take advantage of the built-in Admin interface
5. Provide HTML form processing
6. Integrate automated tests with your code

PRE-REQUISITES:

1. All students should have a working knowledge of HTML 5, and CSS.
2. All students should have a working knowledge of Python

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Install and Configure Python and Django in a development and production environment	BTL1, BTL2, BTL3	PO4,PO5, PO6, PO8
CO2	Understands the security implications of Django using templates and develop secure websites with Django	BTL2, BTL3, BTL4, BTL6	PO4, PO5, PO8
CO3	Utilize Django Models to build an interface with powerful relational databases	BTL3, BTL6	PO5,PO7,PO8
CO4	Design and develop forms (both ad-hoc and from Models and Data Models) and automate the validation and verification of data in those forms	BTL3, BTL4, BTL5, BTL6	PO6,PO8

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UNIT – I

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters - 1, 2, 3]

Web development basics: Client server architecture, webserver, web browser, basic of HTML concept, basics of CSS, basics of JavaScript, Bootstrap.

Introduction to Django: Web Framework, The MVC and MTV Design Pattern, Difference between MVC and MTV design patterns, Django's History, Installation of Python, Installation of Django using PIP command, Understanding Django environment, Django Commands Overview

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 4]

The Basics of Dynamic Web Pages: (Views and URLconfs): Creating View, Dynamic Content, Mapping URLs to Views, processing a Request, URL configurations and Loose Coupling, Creating View with Dynamic URLs, Django's Error Pages

The Django Template System:

Template System Basics, template language: variables, Boolean Operators, for loop, if, Basic Template Tags and Filters, Comments, Using Templates in Views, Template Loading, Template Inheritance Tags, Creating a Model Manipulating Data (CRUD) Linking Models

Django Forms: Creating a form using Django Forms, Render HTML Forms (GET & POST), Form Fields, form field custom widgets, Simple Validation

UNIT – III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter - 5, 7]

Interacting with a Database: Models: Using Database Queries in Views (hard-coding the connection parameters), Configuring the Database, Creating First App , Defining Models in Python, Creating ,Installing the Model, Basic Data Access, Adding Model String Representations, Inserting and Updating Data, Selecting Objects, Filtering Data, Retrieving Single Objects, Ordering Data, Chaining Lookups, Slicing Data, Deleting Objects , Making Changes to a Database Schema , Basic model data types and fields list , Relationship Fields ,Field options, Adding Fields , Validation on Fields in a Model , using Django Field Choices, Removing Fields, Removing Many to Many Fields, Removing Models, creating forms using Models

UNIT – IV

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapters - 6, 12, 14];

The Django Administration Site: Creating superuser for accessing the backend admin app, registering custom Django models with the admin site, customizing admin rendering of Django models, Customizing Django admin templates look and feel.

Deploying Django Project: Real time project: E-commerce domain applications Front-End Back-End HTML, CSS, BOOTSTRAP, DJANGO SQLite

Preparing Your Codebase for Production, implementing error Templates, Setting up Error Alerts

Sessions, Users, and Registration: Getting and Setting cookies, Setting Test Cookies Django's Session Framework: enabling sessions, using session in views, Using Sessions Outside of Views, destroying a session using flush

Security in Django: Cross site request forgery protection, Cryptographic Signing

TEXT BOOKS:

TB1. The Django Book freely available - https://django.book.readthedocs.io/en/latest/index.html

TB2. Django 3 By Example, 3rd Edition,By Antonio Mele

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REFERENCE BOOKS:

RB1. https://docs.djangoproject.com/
RB2. Python Web Development with Django by Jeff Forcier , Paul Bissex , Wesley Chun
RB3. Django for Beginners: Build websites with Python and Django by William S. Vincent

List of Practicals		
S.No.	**Detailed Statement**	**Mapping to CO #**
1.	Install Python including installation of pip, installation and setting up virtual environment, installation of Django	CO1
2.	Create a new django project using command line	CO3
3.	Create a "Hello World" App in Django	CO3
4.	Create a Django Form using forms.py	CO2
5.	Create a Django app Using Django Templates features i.e. Creating Template Objects , Rendering a Template , Multiple Contexts, Context Variable Lookup, Playing with Context Objects, Template Loading, include Template Tag,	CO2, CO3
6.	App to connect templates with models to serve data dynamically	CO4
7.	Creating and using CRUD class based view	CO2
8.	Rendering a model in Django Admin Interface	CO6
9.	Create a Dynamic Feedback form with validations	CO5
10.	Write a Django web app to use parameters in Views.py	CO2
11.	Write a Django web app using control statements (If, for etc.)	CO2
12.	Using blocks in Django Template and Extend base.html in Templates	CO3
13.	Work with Django humanize (https://docs.djangoproject.com/en/3.2/ref/contrib/humanize/)	CO2
14.	Work with Django Template built in Tags and Filter (https://docs.djangoproject.com/en/3.2/ref/templates/builtins/)	CO2
15.	Handling 404, 502 pages in Django	CO2
Application Based Practicals (Implement Any one of the following App)		
1.	Quiz App	CO4
2.	To-do webapp using Django	CO4
3.	Weather app using Django	CO4
4.	Creating a Feedback Form with database submission	CO4
5.	Calorie Counter	CO4

Note:
(i) In total 10 practicals and one small App to be implemented.
(ii) Additional practical may be given by the course instructor.
(iii) This is a suggestive list of programs. However, the instructor may add or change programs as per the requirement of the course.

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Course Code: BCA 222 **L T C**
Course Name: Digital Marketing **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following: -

1. Understand the basics of Digital Marketing.
2. Comprehend the importance of Digital Marketing Platforms.
3. Gain knowledge about the usefulness of Social Media Marketing (SMM) and Search Engine Optimization (SEO)

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO #	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Understanding the digital marketing concepts and its usefulness in business.	BTL2	PO2, PO4
CO2	Planning steps for digital marketing strategy and successfully executing it.	BTL3	PO2, PO4
CO3	Understand the importance of Social Media Platforms and Social Media Marketing for online communication.	BTL2	PO2, PO4, PO6
CO4	Applying Search Engine Optimization techniques (SEO) and Search Engine Marketing (SEM) to maximize reach and enhance engagement of users.	BTL3	PO2, PO4, PO6
CO5	Analyzing web using analytics tools and gaining insights to various tools for Social Media Marketing.	BTL4	PO2, PO4, PO6

Bachelor of Computer Applications

UNIT – I

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter – 1, 2], TB2 [Chapter – 1, 4-9], TB3 [Chapter –1]

Digital Marketing Basics: Digital Marketing meaning and its importance, Traditional vs Digital Marketing, Benefits of Digital Marketing, Internet Marketing basics, Digital Marketing channels, Types of Business models, Digital Marketing strategies (P.O.E.M framework), Inbound and Outbound marketing, Digital Transformation model, 4Cs of Digital Marketing

UNIT – II

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter –3, 4, 5, 6, 7, 8], TB2 [Chapter – 4], TB3 [Chapter – 8]

Social Media Marketing – Introduction, Social Media marketing strategies, Overview of Social media platforms – Instagram, Snapchat, Facebook, Mobile, Twitter, Content Planning and Strategy, Influential marketing, Content marketing, Digital Marketing campaign

UNIT – III

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter – 2, 3, 10]

Search Engine Optimization – Introduction to SEO, On-Page and Off-Page Optimization, Role of Keywords in SEO, Organic vs Non-Organic SEO, Blogging as marketing strategy, Types of Blogs

Search Engine Marketing – Introduction to Paid marketing, Google Adwords, Types of campaigns and Campaign creation

UNIT – IV

No. of Hours: 11 Chapter/Book Reference: TB1 [Chapter – 1, 5, 11]

Tools for SMM and Marketing communication – Overview of Buffer, Hootsuite, Canva, Trello and Hot jar

Web Analytics: Meaning, Purpose and process, Types, Tools for analytics – Google analytics, Audience analytics, Acquisition analytics, Behavior analytics, Conversion analytics

TEXT BOOKS:

TB1. Rajan Gupta, Supriya Madan, "Digital Marketing", BPB Publication, Ist Edition, 2022
TB2. Seema Gupta, "Digital Marketing", McGraw Hill, 2nd Edition, 2018.
TB3. Puneet Singh Bhatia, "Fundamentals of Digital Marketing", Pearson, 2nd Edition, 2020.

REFERENCE BOOKS:

RB1. Ian Dodson, "The Art of Digital Marketing", Wiley, 2017.
RB2. Nitin Kamat, Chinmay Nitin Kamat, "Digital Marketing", Himalaya Publishing House, 1st Edition, 2017.
RB3. Vandana Ahuja, "Digital Marketing", Oxford University Press, 8th Edition, 2019.
RB4. Judy Strauss, Raymond Frost, "E- Marketing", PHI learning, 5th Edition, 2009.
RB5. Moutusy Maity, "Internet Marketing", Oxford University Press, 2018.
RB6. Stephanie Diamond, "Digital Marketing", Wiley, 2019.
RB7. T. N. Swaminathan, Karthik Kumar, "Digital Marketing From Fundamentals to Future", Cengage, 1st Edition, 2019.

Bachelor of Computer Applications

Course Code: BCA 224 **L T C**
Course Name: Principles of Accounting **3 1 4**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop expertise related to the following:

1. To get the knowledge about the important concepts & characteristics of accounting.
2. To study the application of accounting in the general business environment.

PRE-REQUISITES:

None.

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Basic accounting knowledge, accounting equations, accounting concepts & convention.	BTL1	PO3
CO2	Rules of debit & credit, journal, ledger, trial balance.	BTL2 BTL3	PO3
CO3	Final A/c's (Trading A/c, Profit & Loss A/c, Balance Sheet) without adjustment & with adjustment.	BTL3 BTL4	PO4
CO4	Sub division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return Journal, Sales Journal, Sales Return Journal.	BTL4	PO4
CO5	Inventory valuation, Inventory System, Methods of valuation of Inventories (FIFO, LIFO & Weighted Average Method).	BTL5	PO4
CO6	Depreciation concept & causes, Method of recording depreciation & Method of providing depreciation.	BTL5 BTL6	PO5,PO6

UNIT–I

No. of Hours: 11 Chapter / Book Reference: TB2[Chapters - 1,2,3], RB4 [Chapters - 1, 2]

Meaning and nature of accounting, Scope of financial accounting, Interrelationship of Accounting with other disciplines, Branches of Accounting, Accounting concepts and convention, Accounting standards in India.

UNIT–II

No. of Hours: 11 Chapter / Book Reference: TB2 [Chapters - 6, 8], RB4 [Chapters - 5, 6]

Journal, Rules of Debit and Credit, Sub Division of Journal: Cash Journal, Petty Cash Book, Purchase Journal, Purchase Return, Sales Journal, Sales Return Journal, Ledger, Trial Balance.

UNIT–III

No. of Hours: 11 Chapter / Book Reference: TB2 [Chapter – 9], RB4 [Chapter – 8]

Preparation of Final Accounts, Profit & Loss Account, Balance Sheet-Without adjustments and with adjustments.

UNIT–IV

No. of Hours: 11 Chapter / Book Reference: TB2 [Chapters - 11, 12], RB4 [Chapters - 7, 10]

Meaning of Inventory, Objectives of Inventory Valuation, Inventory Systems, Methods of Valuation of Inventories-FIFO, LIFO and Weighted Average Method, Concept of Deprecation, Causes of Depreciation, Meaning of Depreciation Accounting, Method of Recording Depreciation, Methods of Providing Depreciation.

TEXT BOOKS:

TB1. Maheshwari, S.N. and Maheshwari, S. K., (2022) An Introduction to Accountancy, Eighth Edition, Vikas Publishing House.
TB2. Tulsian, P.C., (2020) Financial Accountancy, 2nd edition, Pearson Education.
TB3. Goyal, Bhusan Kumar , Basic Financial Accounting,2020, International Book House Pvt. Ltd.

REFERENCE BOOKS:

RB1. Gupta R. L., & Gupta V.K., “Principles & Practice of Accounting”, Sultan Chand & Sons, 1999.
RB2. Monga J R, “Introduction to Financial Accounting”, Mayur Paperbacks, 2010.
RB3. Raja Sekaran/Lalitha, “Financial Accounting”, Pearsons.
RB4. Goyal V.K. & Goyal Ruchi (2022) Financial accounting ,PHI

Bachelor of Computer Applications

Course Code: BCA 232 **L T C**
Course Name: Personality Development Skills **2 0 2**

INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. There should be 10 questions of short answer type of 2.5 marks each, having at least 2 questions from each unit.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions to evaluate analytical/technical skills of candidate. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks, including its subparts, if any.
3. Examiners are requested to go through the Course Outcomes (CO) of this course and prepare the question paper accordingly, using Bloom's Taxonomy (BT), in such a way that every question be mapped to some or other CO and all the questions, put together, must be able to achieve the mapping to all the CO(s), in balanced way.

LEARNING OBJECTIVES:

In this course, the learners will be able to develop the following:

1. To boost student's confidence through oral and written skills.
2. To help students develop leadership skills and teamwork.
3. To prepare students for work related challenges.

PRE-REQUISITES:
None.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:-

CO#	Detailed Statement of the CO	*BT Level	Mapping to PO #
CO1	Learn Social Etiquettes and social conversation.	BTL1, BTL2, BTL3	PO9, PO11
CO2	Learn Leadership, Decision making and Team-building skills	BTL2, BTL3, BTL4	PO9, PO11
CO3	Improve confidence building skills	BTL2, BTL3, BTL4	PO9, PO11
CO4	Able to manage Stress and Time Management	BTL2, BTL3, BTL4	PO9, PO11

UNIT-I

No. of Hours: 5 Chapter / Book Reference: TB1 [Chapter - 6], TB2 [Chapters - 19, 20] RB2 [Chapter - 4]

Personality Development, Professional Etiquettes, Art of Social Conversation, Basic Body Language, Meeting and Greeting Skills

UNIT- II

No. of Hours: 5 Chapter / Book Reference: TB3 [Chapter - 6], TB4 [Chapters - 12, 13, 16], RB3 [Chapter - 9], RB4 [Chapter - 10]

Leadership and Team-Building Skills, Decision Making and Problem Solving through Effective Communication Strategies. Role plays, Team building

UNIT- III

No. of Hours: 8 Chapter / Book Reference: RB3 [Chapters - 3, 4], RB4 [Chapter - 17]

Confidence Building Skills Self-Introduction, Self-Awareness, Mock Interviews, Extempore, Group Discussion

UNIT- IV

No. of Hours: 4 Chapter / Book Reference: RB1 [Chapters - 4, 6, 9]

Stress and Time Management

Stress management - Meaning, types, Impact /Consequences (Mind, Body and Health), Tips for Busting Stress, Case Studies

Time management- Importance, Techniques. Case Studies

TEXT BOOKS:

TB1. Business Communication by Asha Kaul- PHI

TB2. Personality Development and Communication Skills-I by Urmila Rai and S.M. Rai - Himalaya Publishing House

TB3. Communication Skills" by Sanjay Kumar and Pushp Lata, Oxford University Press.

TB4. Business Communication by Meenakshi Raman and Prakash Singh, Oxford University Press

REFERENCE BOOKS:

RB1. Life Management and Stress Management by Shawn Chhabra

RB2. Personality Development and Communication Skills-II- by C.B. Gupta

RB3. Self-Awareness: The Hidden Driver of Success and Satisfaction – Travis Bradberry

RB4. Business Communication by Hory Sankar Mukherjee, Oxford University Press

Bachelor of Computer Applications

Course Code: BCA 272 **L T/P C**
Course Name: Practical – VIII Java Lab **0 4 2**

LEARNING OBJECTIVES:
In this course, the learners will be able to develop expertise related to:
1. Basic understanding of Object-Oriented Programming Concepts and create classes.
2. Learn Inheritance, exception handling in Java.
3. Understand and implement multithreading programming.
4. Learn building GUI applications using various controls in Swings.

PRE-REQUISITES: Prior knowledge of programming language is mandatory.

COURSE OUTCOMES (COs):
After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	Illustrate the Object-Oriented paradigm and Java language constructs	BT2	PO3
CO2	To inculcate concepts of inheritance to create new classes from existing ones and design the classes needed given a problem specification.	BT3	PO3
CO3	To apply various functions of String class	BT3	PO4
CO4	To facilitate students in handling exceptions and defining their own exceptions.	BT4	PO4
CO5	To manage input output using console and files	BT4	PO4
CO6	To apply the Java Thread model to develop multithreading applications.	BT5	PO4
CO7	To understand and apply the concepts of GUI programming using swings.	BT6	PO5,PO6

List of Practicals		
S. No.	**Detailed Statement**	**Mapping to CO #**
Core Practicals (Implement minimum 10 out of 15 practicals)		
1.	Write a program declaring a class Rectangle with data member's length and breadth and member functions Input, Output and CalcArea.	CO1
2.	Write a program to demonstrate use of method overloading to calculate area of square, rectangle and triangle.	CO1
3.	Write a program to demonstrate the use of static variable, static method and static block.	CO1
4.	Write a program to demonstrate concept of ``this``.	CO1

5.	Write a program to demonstrate multi-level and hierarchical inheritance.	CO2
6.	Write a program to use super() to invoke base class constructor.	CO2
7.	Write a program to demonstrate run-time polymorphism.	CO1
8.	Write a program to demonstrate the concept of aggregation.	CO2
9.	Write a program to demonstrate the concept of abstract class with constructor and ``final`` method.	CO2
10.	Write a program to demonstrate the concept of interface when two interfaces have unique methods and same data members.	CO1
11.	Write a program to demonstrate checked exception during file handling.	CO4
12.	Write a program to demonstrate unchecked exception	CO4
13.	Write a program to demonstrate creation of multiple child threads.	CO6
14.	Write a program to use Byte stream class to read from a text file and display the content on the output screen.	CO5
15.	Write a program to demonstrate any event handling.	C07
Application Based Practicals (Implement minimum 5 out of 10 practicals)		
16.	Create a class employee which have name, age and address of employee, include methods getdata() and showdata(), getdata() takes the input from the user, showdata() display the data in following format: Name: Age: Address:	CO1
17.	Write a Java program to perform basic Calculator operations. Make a menu driven program to select operation to perform (+ - * /). Take 2 integers and perform operation as chosen by user.	CO1
18.	Write a program to make use of BufferedStream to read lines from the keyboard until 'STOP' is typed.	CO5
19.	Write a program declaring a Java class called SavingsAccount with members ``accountNumber`` and ``Balance``. Provide member functions as ``depositAmount ()`` and ``withdrawAmount ()``. If user tries to withdraw an amount greater than their balance then throw a user-defined exception.	CO4
20.	Write a program creating 2 threads using Runnable interface. Print your name in ``run ()`` method of first class and "Hello Java" in ``run ()`` method of second thread.	CO6
21.	Write program that uses swings to display combination of RGB using 3 scrollbars.	CO7
22.	Write a swing application that uses atleast 5 swing controls	CO7
23.	Write a program to implement border layout using Swing.	CO7
24.	Write a java program to insert and update details data in the	CO7

	database.	
25.	Write a java program to retrieve data from database and display it on GUI.	CO7

Note:

1. In total 15 practicals to be implemented. 2 additional practical may be given by the course instructor.

2. This is a suggestive list of programs. However, the instructor may add programs as per the requirement of the course.

Bachelor of Computer Applications

Course Code: BCA 274 **L T C**
Course Name: Practical-IX SE Lab **0 4 2**

LEARNING OBJECTIVES:

Students will be capable to acquire the generic software development skill through various stages of software life cycle. Students will also be able to ensure the quality of software through software development with various protocol based environment. After completion of course student will be able to prepare SRS, analysis the requirement, design the requirements and generate test cases to test the project. Students will also be able to handle software development models through rational method. Rational Rose Enterprise Edition software is used to serve the objectives.

PRE-REQUISITES:

None

COURSE OUTCOMES (COs):

After completion of this course, the learners will be able to:

CO #	Detailed Statement of the CO	BT Level	Mapping to PO #
CO1	To apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.	BT2	PO3
CO2	Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.	BT3	PO3
CO3	Analyzing and developing a software product along with its complete documentation.	BT3	PO4
CO4	Work as an individual and as part of a multidisciplinary team to develop and deliver quality software in one or more significant application domains.	BT4	PO4
CO5	Demonstrate an ability to use the techniques and tools necessary for engineering practice	BT4	PO4

List of Practicals

S.No.	Detailed Statement	Mapping to CO #
1.	Select and Write down the problem statement for a real time system of relevance.	CO2, CO3
2.	Analyze requirement for a system and develop Software Requirement Specification Sheet (SRS) for suggested system.	CO2, CO3

3.	To create the function oriented diagram: Data Flow Diagram (DFD)	CO2, CO3
4.	To perform the user‘s view analysis for the suggested system: Use case diagram.	CO2,CO3, CO4
5.	To draw the structural view diagram for the system: Class diagram	CO4
6.	To draw the behavioral view diagram : State-chart diagram or Activity diagram	CO2, CO3,CO4
7.	To perform the behavioral view diagram for the suggested system : Sequence diagram	CO2, CO3,CO4
8.	Draw the component diagram	CO2, CO3,CO4
9	Draw the Deployment diagram.	CO2, CO3,CO4
10.	Perform Measurement of complexity with Halstead Metrics for chosen system.	CO4

Suggested Applications

(i) Inventory Management
(ii) Library Management
(iii) Result Management
(iv) Hotel Management System
(v) Any Website
(vi) Any mobile application
(vii) E-Commerce website
(viii) Any other application

Note:

1. **Students are required to identify an application in the beginning of the semester and conduct all practicals for the same application.**
2. **In total 10 practicals to be implemented.**
3. **Students may use any open source software i.e. argoUML for drawing the above diagrams.**
4. **Students may Use testing tool such as junit.**
5. **Student may Use configuration management tool-libra.**

REFERENCE BOOKS:

RB1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.